

CLAIMS

1. A device for detecting objects placed on a human subject, said device comprising at least
 - 5 • a source for generating a microwave signal;
 - a horn for sending said signal, said horn illuminating an area of the body of said human subject;
 - a horn for receiving the signal reflected by
10 said area;
 - a structure bearing at least the sending horn and the receiving horn;
 - means of analyzing said reflected signal;characterized in that
 - 15 • the source for generating the signal comprises means for generating the signal in a known state of polarization, said signal illuminating said area of the body at a non-zero angle of incidence;
 - 20 • the analysis means comprise first means for determining the energy and polarimetric characteristics of the reflected signal, second means for determining from said characteristics the presence of objects placed on said human
25 subject and third means for warning of said presence.
2. The detection device as claimed in claim 1,
30 characterized in that the device comprises means for sending or receiving the signal on one and the same so-called sending/receiving horn.
3. The detection device as claimed in claim 1 or 2,
35 characterized in that the device also comprises a synchronous detection linking the source for generating the microwave signal and the analysis means.

4. The detection device as claimed in one of claims 1 to 3, characterized in that the source comprises means for generating the signal at a variable frequency, said frequency being between a few
5 gigahertz and 70 gigahertz.
5. The detection device as claimed in one of claims 1 to 4, characterized in that the source or the
10 sending horn comprises means for sending a linearly polarized signal, the direction of polarization of said signal being oriented at approximately 45° from the average plane of incidence of the signal on the illuminated area of the body.
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6. The detection device as claimed in one of claims 1 to 4, characterized in that the source or the
20 sending horn comprises means for sending a circularly or elliptically polarized signal.
7. The detection device as claimed in one of claims 1 to 4, characterized in that the source or the
25 sending horn comprises means for sending a polarized signal having different combinations of parallel and perpendicular polarizations varying over time.
8. The detection device as claimed in one of claims 5 or 6, characterized in that the first means of
30 measuring the polarimetric characteristics of the reflected signal are of ellipsometric type, namely that they allow the main orientation and ellipticity of the received polarization to be measured.
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9. The detection device as claimed in claim 8, characterized in that the first ellipsometric measurement means comprise a microwave polarizer

disposed in front of an intensity detector and means of rotating said polarizer.

10. The detection device as claimed in claim 9,
5 characterized in that the rotation means comprise either a direct current motor or a stepper motor.
11. The detection device as claimed in claim 8,
10 characterized in that the receiving horn is of the orthomode type and that the first measurement means comprise two detectors placed at the output of said receiving horn.
12. The detection device as claimed in claim 7,
15 characterized in that the first means of measuring the polarimetric characteristics of the reflected signal are a receiving horn for receiving a polarization oriented at 45° from the reflection plane of the illuminated area of the body.
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13. The detection device as claimed in one of the preceding claims, characterized in that the mechanical structure is a security gate of a size sufficient to allow the human subject to pass
25 through.
14. The detection device as claimed in one of claims 1 to 12, characterized in that the mechanical structure is portable and comprises a mechanical
30 part on which are disposed the sending and receiving horns and a handle.
15. The detection device as claimed in claim 14,
35 characterized in that the horns are of the sending/receiving type.
16. The detection device as claimed in claim 14 or 15, characterized in that the structure comprises four horns disposed at the peaks of a parallelogram.

17. The detection device as claimed in one of the preceding claims, characterized in that it also comprises means of measuring the temperature of the human body.
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